CO-DIGESTION OF PALM OIL MILL EFFLUENT (POME) WITH COW MANURE FOR BIOGAS PRODUCTION

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To my beloved family and friends

Thanks for the support, caring and sharing

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ABSTRACT

In this study, experiments were conducted to investigate the production of biogas through anaerobic digestion from the co-digestion of palm oil mill effluent (POME) with cow manure. Besides, the effect of co-digestion towards the change of methane composition in biogas was also evaluated. The batch type of digester was used for the digestion and was operated at room temperature, 28 ± 2˚C for 10 days. The digester was operated at different V_{CM} / V_{POME} (volume of cow manure/ volume of POME) ratio of 0.05, 0.10, 0.15, 0.22, 0.29 and 0.36. From the results, biogas production was enhanced by the addition of cow manure to POME. The volume of biogas production was increase from 36% up to 126% with addition of cow manure. In addition, through co-digestion, the percentage composition of methane in biogas was also increases with the increment from 28% to 42 %. This study can provided useful information for the researchers and agricultural practitioners that interested on improving and applying for this type of anaerobic digestion in the future.

Keywords: Biogas, Methane, Anaerobic digestion, Co-digestion, POME and Cow manure.

ABSTRAK

Dalam kajian ini, ekperimen telah dijalankan bagi menyiasat penghasilan biogas menerusi penghadaman anarobik daripada ko-penghadaman sisa pemprosesan kelapa sawit bersama najis lembu. Selain itu, kesan ko-penghadaman terhadap perubahan komposisi metana di dalam biogas turut dikaji. Penghadam jenis '*batch*' telah digunakan untuk penghadaman dan beroperasi pada suhu bilik, 28 ± 2˚C dalam tempoh 10 hari. Penghadam beroperasi pada nisbah V_{CM} / V_{POME} (isipadu najis lembu / isipadu sisa pemprosesan kelapa sawit) yang berbeza, iaitu pada 0.05, 0.10, 0.15, 0.22, 0.29 dan 0.36. Menerusi keputusan, penghasilan biogas berjaya ditingkatkan dengan penambahan najis lembu kepada sisa pemprosesan kelapa sawit. Penghasilan isipadu biogas meningkat dari 36% sehingga 126% dengan penambahan najis lembu. Tambahan pula, dengan ko-penghadaman, peratusan komposisi metana dalam biogas juga meningkat dengan tokokan tambahan daripada 28% sehingga 42%. Kajian ini dapat memberi informasi yang berguna kepada pengkaji dan pengamal agrikultur yang berminat untuk menambah baik dan mengaplikasikan metodologi penghadaman anarobik ini pada masa hadapan.

Kata kunci: Biogas, Metana, Penghadaman anarobik, Ko-penghadaman, Sisa pemprosesan kelapa sawit dan Najis lembu.